A NEW SPECIES OF TROUT FROM LAKE TAHOE

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While engaged under the direction of the United States Bureau of Fisheries in an examination of the fauna of the various river basins that were at one time connected with the quaternary Lake Lahontan, a very remarkable species of trout was observed, which, although known to many sportsmen and fishermen, has entirely escaped the attention of ichthyologists. It is the purpose of this paper to record something of what is now known of its characteristics and present a preliminary description of the species.

Lake Lahontan, which in quaternary times was a large body of water very irregular in shape, extended over a considerable part of northern Nevada. By a shrinkage of the great lake, due to desiccation, a number of its tributary streams became detached and now remain as minor systems. Their waters ultimately disappear through evaporation or by sinking in the loose, dry sand of the deserts, which now cover the floor of the old lake, whose ancient terraces and gravel bars are plainly visible on every side. The largest and most important of these minor basins is that of the Truckee River, including Lake Tahoe and tributary streams, which form its source, and Pyramid and Winnemucca Lakes, into which the river flows, and where its waters are finally carried off by evaporation.

The rivers and lakes of the various basins which belong to the Lahontan system are well supplied with fishes, exceedingly abundant in number although representing but a few species. Of chief interest and value among these are the trout, which appear to have found the most advantageous conditions for growth and development in the Truckee River basin. A résumé of the information obtained from the more intelligent anglers shows that they here distinguish six varieties of native trout. Three forms are recognized in the lower portion of the basin, viz, the large redfish, which in early spring ascends the Truckee River to spawn; the Tommy trout, which is smaller, darker colored, and more conspicuously spotted, and which ascends the river at a later date than the redfish; and the greenback, a deep-water, silvery trout, which occurs in Pyramid Lake, presumably spawning there. Three varieties are distinguished also in the upper Truckee region: The Tahoe trout, dark in color, boldly and regularly spotted, ascending the tributaries to spawn; the silver trout, somewhat similar to the foregoing except that it is decidedly silvery in color, the spots are smaller and somewhat more elongate, and the body is deeper and heavier; and, finally, the royal silver trout, blue above, silvery on the sides, and almost entirely without spots.

In discussing the status of these forms anglers are found to differ considerably among themselves. Some distinguish two, three, or more of them, but none has been interviewed who recognizes all. Concerning the silver trout, it is difficult to find two men who entertain the same opinion. The writer first learned the name "royal silver trout" from Mr. Ralph Lowe, of San Jose, who caught a fine specimen and sent it to Stanford University. This was followed by another, which was presented to the university by Mr. F. K. Pomeroy, a graduate student in the department of medicine, and also by a third, caught by Mr. W. P. Lyon, of San Jose. Each of these was caught near Brockway, on the east side of Lake Tahoe. The collection was further enriched by another example, which had been sent to Dr. C. H. Gilbert by Mr. Charles A. Vogelsang, the fish having been caught somewhere near Tahoe City. It is with these specimens representing the royal silver trout that the writer is at present most concerned.

Ichthyologists themselves have not been altogether unwavering in their discussions of Lake Tahoe trout. It seems, however, to be generally admitted that the Tahoe trout and silver trout belong to the same species, Salmo henshawi Gill and Jordan. A recent examination of an additional number of specimens seems to strengthen that conclusion. For the present, at least, the redfish and the Tommy are considered as representatives of that species. The royal silver trout is, however, not to be confused with S. henshawi, for it evidently belongs to a distinct and well-characterized species, which may hereafter be known as Salmo regalis. This species does not appear to be closely related to either the cutthroat trout (S. clarkii, S. henshawi, and others) or the rainbow trout (S. irideus). The greenback trout of Pyramid Lake probably belongs to the same form.

Salmo regalis is distinguished above all else by its unusual color. A fresh specimen (the writer has not seen a living example) is of a beautiful deep steel blue on the dorsal surface, which in some lights seems to be tinted with olive, the blue extending downward on the sides to about the sixth row of scales above the lateral line, where it abruptly gives place to the most brilliant and highly burnished silver. The silver sheen grows dull on the ventral surface, the chin, throat, and abdomen being dead white. No dark spots are to be seen except on the dorsal and caudal fins, where they are very inconspicuous. No red or yellow color is to be found anywhere except on the cheek where it glows faintly through the silver. Structurally the species differs from the other native trout, S. henshawi, in having a shorter head, a shorter and more rounded snout, a much smaller maxillary, larger scales, narrower and more pointed fins, perfectly smooth basibranchials without teeth, fewer gillrakers. It differs also in other respects, which, together with those enumerated, will appear in the following description:

Salmo regalis, new species.

Royal silver trout.

Head, 4.4 in length to base of caudal; depth, 4; depth caudal peduncle, 9.5; snout, 4.5 in head; length of maxillary, 2.1; vertical diameter of eye, 5.8; dorsal rays, 11; anal, 11; longitudinal series of scales above lateral line, 144; in series between lateral line and middle of back, 29; pores in lateral line, 120.

Body shaped as usual among trout, perhaps somewhat flatter than ordinary, the width contained 2¾ times in the depth near middle of body. Snout short and rounded; maxillary weak, narrow, and short, scarcely extending beyond a vertical through posterior edge of orbit. Opercles and branchiostegals rather thin and papery. Jaws weak; their teeth small and sharp; teeth in bands on vomer and palatines; 2 rows of 5 teeth each on the tongue; basibranchials smooth and without teeth. Branchiostegals, 11. Gillrakers on first arch, 7+12, slender and pointed. Lateral line almost straight from opercle to caudal. Scales very thin, not deeply embedded, moderate in size on the sides, extremely small on middle of back anterior to dorsal fin and on throat and abdomen. Fins all comparatively thin and frail, not like those of trout from mountain streams; pectorals and ventrals sharply pointed; dorsal and anal with slightly concave edges; caudal deeply cleft, the lobes pointed; adipose fin thin, narrow, and elongate.

Color in alcohol, dusky above, silvery on the sides, white beneath; dorsal and caudal fins dusky; anal somewhat dusky toward the border; pectorals and ventrals immaculate; no spots or bars on the head, body, or fins. On close examination the scales are observed to be silvery, those on the dorsal region closely speckled with black, those beneath with but little luster.

The type, which will be deposited in the United States National Museum, is a specimen measuring 323 millimeters in length, collected near Brockway, Lake Tahoe, Cal., August 23, 1912, by Mr. W. P. Lyon.

No external sex differences appear, a male and female being alike in all outward respects. Three of the specimens have 5 rows of small, elongate spots on the dorsal fin, some small spots on the caudal, and a few poorly defined spots on the dorsal part of the body. The latter did not become visible until the specimen had been in alcohol for some time. In the new species the maxillary averages 0.114 of the length to base of caudal; in S. henshawi, 0.145, as exhibited by 10 examples from Lake Tahoe, 0.141 in 10 from Pyramid Lake, the sexes being equally represented. The gillrakers differ as follows:

	S. regalis.			S. henshawi.				
Number on upper arch	7 I	8	9	9	10	11 2		
Number on lower arch	11	12 I	13 2	12	13 9	14 17	15	

The difference becomes more evident when the entire number on both limbs of the gill arch is taken into account, and this method of enumerating them is the better, as it is usually difficult to determine whether the one at the angle should be included with those above or below.

	S. reg	S. henshawi,				
Number of gillrakers. Number of specimens.	19 1	20 2I I 2	22 4	23 11	24 13	25 2

Two examples of the new form have 42 and 57 cæca, respectively.

The measurements in the following table are recorded in hundredths of the length measured to the base of the caudal fin.

MEASUREMENTS OF SPECIMENS OF SALMO REGALIS.

Catalogue number	370	37 ^I	372	416
Length body	305	225	270	250
Length head	• 23	• 235	. 225	• 235
Depth body.	. 22	. 22	. 245	. 23
Depth caudal peduncle	.005	.00	. 10	.005
Length caudal peduncle	• 175	. 18	• 10	. 18
Length snout	• 05	.05	• 05	.05
Length maxillary	• 11	. 12	• 105	.12
Diameter eye.	• 04	• 045	•04	.04
Interorbital width	• 07	.07	• 075	.08
Depth head	• 16	. 16	• 16	. 155
Snout to occiput.	. 16	. 15	• 145	. 146
Snout to dorsal.	.49	• 48	.48	. 5I
Snout to ventral	- 56	• 54	• 52	.54
Length base of dorsal.	. 12	. 12	.14	.13
Length base of anal	.II	. 11	. 10	. 198
Height dorsal	. 12	.12	• 14	. 14
Height anal.	. 13	.125	.13	. 12
Length pectoral	. 15	. 15	. 16	.15
Length ventral	. 12	. 12	.14	. 125
Length caudal	. 20	. 20	. 22	. 22
Dorsal rays.	IO	10	11	10
Anal rays	II	111	11	11
Pectoral rays.	14	14		14
Scales lateral series	152	153	144	150
Scales above lateral line.	30	-33	20	29
Branchiostegals	12	13	11	12
Sex	ğ	i ^3	ਰੰ	

Specimens of this species are not often taken, and they seem to be growing less common from year to year.